A-0616

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MAT-604

M.Sc. MATH (MSCMT)

(Fluid Mechanics)

3rd Semester Examination, Session December 2024

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

Long Answer Type Questions 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Determine the acceleration at the point (2, 1, 3) at $t = 0.5$ sec, if $u = yz + t$, $v = xz - t$ and $w = xy$.

2. Determine the equation of stream lines for the velocity vector $V = x\hat{i} + y\hat{j}$ passing through point (2,1).

3. Briefly explain the application of Bernoulli's theorem.

4. Determine the image of a line doublet parallel to the axis of a right circular cylinder.

5. What is the difference between transnational and rotational motion.

Section–B

Short Answer Type Questions 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Explain hydrostatic law.

2. Differentiate between absolute pressure, gauge pressure and vaccum pressure.

3. Derive the formula for flow of two immiscible viscous fluids between two parallel plates.

4. Consider a velocity field $u = 2x - y^2$ and $v = 4y$. Verify if it satisfies the continuity equation.

5. Define two-dimensional flow in fluid dynamics.

6. Explain the Physical Significance of Stream Function.

7. Define the Relation Between Rectangular Components of Stress.

8. Define Relation between stress and rate of strain.

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